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OF THE

STRAITS

AND

FEDERATED MALAY STATES.

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THE THIRD INTERNATIONAL RUBBER EXHIBITION.

There is much to commend the proposal of holding the Third International Rubber Exhibition in New York during the current year and it is gratifying to learn that what appeared to be lukewarm interest in London and the East is being replaced by active support. The India Rubber Journal of February 17 states that "at a special meeting of the Rubber Growers' Association held at the London Chamber of Commerce this week, it was resolved to present to the New York Rubber Exposition, which opens in September next, a series of gold, silver and bronze medals for free competition open at all the rubber plantation countries in the world exhibiting at the exposition."

"The condition of the competition is that at least one hundredweight of rubber—to be a commercial, not an exhibition, sample—mustbe shown for each entry made, and planters are to have the privilege of making more than one entry if they wish."

Every one will be aware that of all industries those pertaining to agriculture are the slowest to mature, although the rapid development of plantation rubber has been amazing, and where events have moved so quickly it cannot be complained that the industry is suffering from a plethora of exhibitions; while the stimulus of the preceding exhibitions have materially assisted development.

Writing on the scope and utility of the proposed exhibition Mr. Pearson, Editor of The India Rubber World, says:—

"Steps have been taken to secure exhibits of crude rubber from every rubber producing country in the world.

There is also in process of formation an advisory committee, made up of the most influential manufacturers, chemists, importers, and scientists in every way connected with the trade.

There will be notable loan exhibits, European and American, exhibits of laboratory and factory appliances, etc., etc.

There will be a series of conferences at which essays on various subjects of interest to the trade will be read.

When one considers that the United States not only uses one half of the world's crude rubber, but manufactures much more than one half of the world's rubber goods; when one further considers the very general interest that the press and the people of the country are to-day evincing in rubber, it would appear that the exhibition was timely. That it can be made broadly informing to every trade and profession, to business organizations and to schools, goes without saying, and Mr. Manders' past record furnishes no reason to doubt his complete grasp of the possibilities as well as his ability to carry his plans through to a successful finish."

A Rubber Exhibition in New York offers an opportunity to planters to emphasise the real position of the present and prospective magnitude of plantation rubber in the East, which financial statements showing the area under cultivation and the output of rubber fail to convey, as is evidenced by the American manufacturers, and delegates from Brazil, who have visited Singapore and the Federated Malay States during the past few months.

Hitherto manufacturers (the real masters of the rubber market) held large stocks of crude rubber, and this policy is slowly changing in favour of forward contracts with estates. It only remains to convince all manufacturers that the plantation industry is an established one, and that the output of over 10,000 tons for Malaya during 1911 will be largely exceeded year by year. It would therefore be of direct advantage to estates to earn a good name on the market.

Another advantage is offered, which should not be lost sight of, by displaying plantation rubber in bulk, it furnishes an opportunity of conveying to all concerned the improbability of synthetic rubber replacing raw rubber. Synthetic rubber is a scientific fact so far as the laboratory is concerned, and it may not be long before the commercial proposition is before the world. Rubber displayed in bulk would be more convincing than figures. It could be seen what the substitute would have to replace in both wild and cultivated raw rubber, and also, what is usually forgotten, reclaimed rubber. Both, governments and financiers, might pause to think that rubber trees can be brought into bearing in a few years, while turpentine, the base of synthetic rubber and the product of fir trees, approach a century. Two results are apparent, the gradual destruction of forests which could not be replaced; the consequent increased price of turpentine, and the improbability of producing synthetic cheaper than raw rubber.

The converse of synthetic rubber is overproduction of plantation rubber—also a possibility. Outside Malaya there is more real activity in planting rubbers at the present time than at any previous period; Brazil is both planting and fostering natural reproduction; the West Indies have embarked on a strong rubber planting policy; all tropical Africa is actively engaged in planting Para and Ceara; from India Ceara is expected to be largely exported; Mexico expects to increase her output in the near future.

Where so many countries are engaged different systems of cultivation and methods of preparation naturally follow, and the opportunity presents itself at the forthcoming exhibition of studying the real position in all its latest developments.

"Entries for the competition close on August 1, and are to be made direct to Mr. A. Staines Manders, c/o the Grand Central Palace, 46th to 47th Streets, Lexington Avenue, New York city."

It is inferred that exhibits not intended for competition would be received later, as the exhibition opens during the last week in September 1912.

The following suggestions are made from experience and to avoid errors and save delay:

1. All cases of exhibits should be fastened by screws and not nails. Nailed cases frequently split and are spoiled for returning.
2. The name of the estates, settlement or state, should be stencilled or printed on 2 or 3 faces of the case. Consignee's address on top of case.
3. Cases to be returned should have the addresses printed on a board and screwed face downwards on top of the case when consigned to New York.
4. Full instructions; if for competition; description of contents; number of cases; weight of rubber; whether offered for sale or to be returned; address for returning; should be communicated to the local secretary, or direct to the Commissioner.
5. Instructions should not be enclosed in the cases of rubber.
6. Instructions, part to local secretary or Commissioner, and part to agent or friend, should be avoided.
7. Cases should be numbered and contents described on case, as well as mentioned with instructions.

The matter is receiving the attention of Government, and it only remains for plantations to come forward with rubber in bulk to place Malaya in the front of rubber producing countries.

R. DERRY.

IPECACUANHA.

(Cephaelis Ipecacuanha.)

The superior claims of rubber have so absorbed the attention of planters during recent years that only occasional enquiry is made of other plants With many economic plants, particularly drugs, the demand is temporary only and a fascinating price is best measured by the possible demand for the product and the probable extent of its cultivation.

At the present time enquiry is again being made respecting Ipecacuanha, and considering the consumption and consequent demand for the drug, the limited sources of supply, its slow reproduction and cultivation, there does appear a prospect for further development. In most instances, however, enquiry is based on the suitability of the plant for a Catch-crop, and the object of this note is to indicate its inadaptability for cultivation under such conditions.

Cephaelis Ipecacuanha is a dwarf, half shrubby, shade loving plant indigenous to many parts of Brazil, and sparsely in New Granada and probably Bolivia. It was first introduced to Europe about 1830 and to India 30-40 years later. Ipecacuanha is prepared from the dried roots of the plant which are exported from Brazil, Cartagena, Selangor and Johore, and India *(an analysis showing the relative value of the commercial drug from the first three countries mentioned is published in the Agricultural Bulletin p. 364, Vol. 8.)* Its cultivation—owing to its special requirements—is still limited while the demand for the drug is increasing.

Bentley and Trimen describe the process of collection in Brazil as follows:—"The roots of the Ipecacuanha plant are collected more or less all the year round, but less during the rainy season from the difficulty then experienced in drying them properly. The collectors are called Poayeros from the Brazilian name Poaya by which this plant is known. A Poayero collects the roots by grasping in one hand as many stems as he is able, and with the other he pushes a pointed stick obliquely with a see-saw motion in the ground beneath the plants, by which he is able to pull up a lump of earth with the inclosed roots in an almost unbroken state. The earth is then shaken from the roots which are placed in a bag brought for that purpose, and the same process is repeated with other plants. When the Poayera pulls up the roots, he breaks them at certain points, and from these broken parts of the roots which are left in the soil, young plants are subsequently produced, and thus the total destruction of the plant is avoided."

In the East the plant is reproduced by root cuttings (so far as I know it does not seed locally, but where well matured plants are available old enough to flower, seeds could be produced by artificial fertilization) but such cuttings are not easy to establish, and if the root is subdivided into numerous cuttings due protection to prevent loss from excessive damp is necessary. On virgin soils, or where there is a depth of vegetable humus and the situation is moist and shady, the plant grows well when established but the properties of the root deteriorate with continued cultivation. Such deterioration might be minimised, if not avoided, by mulching with leaf-soil and burnt-earth, especially burnt-humus, as the lime contained in burnt-earth and applied in this form, although the proportion is small, is easy of absorption. Careful cultivation is necessary as the alkaloid or active principal of the drug, only amounts to about 1 per cent. of the root.

The Brazilian plant is variable in habit, and the Cartagena or Colombian variety is distinct and of less commercial value.

R. DERRY.

Mr. R. H. True (Bureau of Plant Industry of the U. S. Department of Agriculture) has been supplied with the following information from the American Consul at Cartagena regarding the cultivation of Ipecacuanha, and this we publish from the "Oil Paint and Drug Reporter" Ipecac, a trailing plant thrives best in clay soil along the banks of rivers. While it requires a great deal of moisture, it cannot live under water, and consequently in Colombia it is found in its best development in regions where the rainfall is abundant, but where the rivers do not overflow.

The Sinu River is the ideal region for ipecac. The plant is found in abundance from near the head-waters of this river . . . The growth extends to a distance of several miles on each side of the river and also to the more important tributaries of the Sinu, the Esmeralds, Verde and Manso rivers. In regions where the water is excessive, such as the valleys of the Atrato, the plant though found, has a poor growth and is of an inferior quality. In gathering ipecac the whole plant is up-rooted and the thin and soft rootlets are thrown away, and these discarded rootlets serve as a means of reproduction, becoming in a year well-developed plants having valuable roots of their own. The present demand for ipecac is good, for the average price in Cartagena is about $1.80 per lb. and $2.20 per lb. can be obtained in some of the foreign markets for the dry roots. The European demand is especially strong. France paying from 10c. to 20c. more than can be obtained in the United States. The total shipment of ipecac from this port during the calendar year 1910 amounted to 14,181 kilos. The area from which Cartagena ipecac is derived is very extensive and somewhat scattered, though by far the most important region is that of the Sinu River and its tributaries. It is thought that the land actually covered by the plant must embrace several hundred square miles, though any attempt at an accurate estimate would be useless. A relatively small amount of Cartagena ipecac comes from the Atrato, and it is of inferior quality. In addition to the two regions mentioned, there is still another, nearer than either of them to Cartagena, called San Onafre. Ipecac is not an object of cultivation in Columbia, though there is no reason why it should not be, except the fact that it is found wild in such abundance."

(*The Chemist and Druggist*, Feb. 24, 1912, p. 78).

CALABAR BEAN.

(Physostigma Venenosum).

A plant allied to the runner-beans (Phaseolus) and native of Nigeria and the Congo where it is used as an ordeal, but owing to its poisonous properties the production has been discouraged.

The drug, which is obtained from the ripe seed, has been recognized in different Pharmacopæias for many years as a valuable poison and for external use in cases of Myopia. Quite recently a further chemical examination by the Wellcome Chemical Research Laboratories has resulted in the isolation of a new alkaloid which will doubtless add to the value of the plant although the demand may be limited.

R. D.

COCAINE.

(Erythroxylon Coca.)

In the Agricultural Bulletin of the Straits Settlements and Federated Malay States page 336 vol. VII. there is an account of this plant as grown in the Botanic Gardens Singapore and a report from the Imperial Institute on a sample of dried leaves submitted by the late Mr. Machado for analysis and valuation. The colour of the leaves was not quite good but "the percentage of alkaloids present was equal to the average amount found in commercial supplies of Coca leaves from other sources." Planters are also cautioned that the demand is small and that leaves would be over-produced if extensively cultivated.

At the present time the price is high and leaves from the East appear to be exported from Java only. The plant is exceptionally hardy and is grown as a hedge-plant in the Singapore Gardens. There would be a great saving in handling and freight if anyone cared to try the production of Cocaine instead of exporting leaves.

R. D.

The Production of Cocaine in Peru.

This subject receives attention in a recent number of *The Engineer*, in an article which is reproduced in *Peru To-day* for September 1911: In introducing the article, the latter publication points out the importance of the cocaine industry in Peru; this is shown by the circumstance that the value of the annual production of the drug is £2,500,000. A great part of this is exported, while most of the rest is consumed by the native Indians.

The account in *The Engineer* states that the processes employed in Peru for the extraction of cocaine from the leaves of the coca plant *(Erythroxylum Coca)* are crude, owing to the fact that the treatment takes place in the interior, on account of the expense of transport of the leaves; the extent of this expense is illustrated by the fact that 200lb. of coca leaves are required for the manufacture of 1lb. of cocaine. Doubtless, improved means of communication will bring the manufacture nearer the coast, and then better methods will be employed.

For the extraction of the drug from the leaves, three operations are employed: (1) maceration, (2) intermediate precipitation, and (3) final precipitation. For maceration, the leaves are placed in four tanks, in the first of which they are treated with a 0.5 per cent. solution of sulphuric acid. After twenty-four hours, the liquid is allowed to flow into the second tank and the first is again filled with new leaves and the acid solution. After another interval of 24 hours, the contents of the second tank are run off into the third while the former is filled from the first as before, the first again receiving a new charge. The fourth tank, after another period of twenty-four hours, is filled from the third, and the preceding processes with the other tanks are repeated. In this way, leaves in a state for further treatment, namely, those originally put into the first tank, are obtained at the end of four days. The tincture thus obtained is next placed in a strainer, for the purpose of filtration, after which the processes of maceration is complete.

For the intermediate precipitation, the tincture is subjected to the action of sodium carbonate in cylindrical vessels. At this stage, in order to test if precipitation is complete, a small quantity of the tincture is removed, filtered from the cocaine, and the filtrate tested with ammonia, when there should be no precipitate formed. The obtaining of a precipitate indicates the necessity for the addition of sodium carbonate to the tincture in the cylindrical vessels.

The first operation for the final precipitation is the addition of petroleum, the mixture being stirred carefully for three to four hours at a very slow rate. At the end of this period the oil, which now contains the cocaine, is washed with acid-free water, and then treated with acidulated water, the proper amount being determined by the testing for precipitation of an aliquot part. During this process, the mixture is stirred vigorously for half an hour to forty minutes, with the result that the cocaine is transferred from the oil to the acidulate water, which can be separated from the former after the mixture has been allowed to stand for about a quarter of an hour.

At this stage, the extract is ready for final precipitation, which as before is effected with sodium carbonate, the amount required being determined by a test with an aliquot part of the solution. The mixture is then allowed to settle for twelve hours and, filtered while being washed with distilled water, to remove any excess of sodium carbonate. The wet residue of cocaine is finally subjected to pressure, when the drug is obtained as a white paste containing 87 to 93 per cent. The usual yield is about 2¼lb. of cocaine per day of twenty-four hours.

When inferior leaves are used, the product is brownish in colour and has to be subjected to further treatment, similar to the above: this results, however, in the loss of some of the cocaine. A last matter of interest is that the approximate cost of producing 1 lb. of cocaine is about £5—an amount which naturally varies with the price that has to be given for the leaves.—*Agricultural News, West Indies.*

INDIGO.

(Indigofera tinctoria.)

The following paper read before the Ceylon Agricultural Society on the possibility of producing natural Indigo to compete with the synthetic dye is of especial interest for its latent possibilities.

Synthetic Indigo is a bye-product of coal-tar and although extensively used it has not entirely replaced the natural indigo.

For silks and high class textile goods the natural dye is still preferred for its durability as a fast dye.

As the indigotine, or blue colouring matter, varies with cultivation and preparation from 20 to 90% there does appear an opportunity for producing an improved standard dye. It is very probable too, that in preparing the Indigo in the form of paste there is considerable saving over solid or cube Indigo which is the result of sterilizing. (Singularly, some years ago, great efforts were made in Singapore to produce solid or stick Indigo which failed).

Locally, the plant is grown from cuttings and not seeds, so that it may improve the cultivated product if seeds were tried instead of cuttings.

Formerly the cultivation was extensive but has gradually dwindled to almost nil, possibly due to a combination of causes.

When Indigo was extensively cultivated in Java and Sumatra it was known that its cultivation improved the soil for tobacco, sugar and other crops.

It certainly deserves careful experimental trials for green soiling with rubber, but if intended as a Catch-crop, a good water supply is essential and prospective crops assured before embarking on the apparatus necessary for its preparations.

R. D.

Ceylon as an Indigo Country.

Interesting Paper.

Baron Schrottky—then read an excellent paper entitled, "The cultivation of Indigo in Ceylon," in which he said:—

The object of the paper on Indigo, which you have permitted me to read to you to-day, is to arouse interest in an industry which, for some time past, has been considered moribund, if not dead.

The natutal indigo industry, at one time one of the most prosperous industries in the East, has been practically ruined by the competition of a synthetic dye.

Adolf von Bayer discovered in 1880 a method of producing from coal tar products a substance identical in every respect with indigotine, the chief dyeing principle in the indigo of commerce, in which it is found to the extent of about 60 per cent.

The Badische Soda and aniline Fabrick acquired Bayer's patents, and in 1897 brought into the market a synthetic indigotine at a price low enough to compete with the natural dye. The Badische Company was able to sell their product at a profit at the cost price of natural indigo, which was then about Rs. 120 to Rs. 150 per maund of 74 lb.

This competition naturally resulted in the closing of most indigo factories in Bengal and Northern India which were dependent for financial assistance on Calcutta houses and only those planters who had land of their own, on which they could very profitably utilize the excellent manure which indigo refuse yields, were able to keep their heads above water.

The export of indigo, which in 1896 was 187,337 cwt, valued at nearly 4 million pounds sterling, had fallen in 1910 to 18,061 cwt. valued at a little over 200,000 pounds sterling.

Indigo continued to be grown in Behar and elsewhere in India, but chiefly for the sake of manure it yields, the dye coming to be looked upon almost as a by-product. It was at the darkest period of the Indian indigo industry that Sir Edward Law, Finance Member of the Indian Council, in his Budget speech, March, 1904, spoke hopefully of a possible revival of the industry, if planters would only put their factories on a sounder financial basis, practise economy in the management of their estates, select the best yielding variety of the indigo plant, and adopt more scientific methods of manufacture. It is due to a few of the more enterprising planters of Behar that progress has been made in these directions.

The great increase in the yield of dye obtained by the latest developments of the industry will be more fully realised by comparing a maximum outturn of ¼ lb. of dry from 100 lb. green plant in 1887, which was then spoken of as "marvellous," with the ¾ lb. of dry dye which 100 lb. of green plant can be made to yield now, an increased outturn which, 20 years ago, would have been regarded as impossible. But quite as important has been the advance in the marketing of the dye in the more convenient form of a paste of such qualities and of such an atomically fine division of the dye that—speaking from practical experience—as much yarn can be dyed a certain shade with one pound of Indigotine in the Standard Natural Indigo paste than can be dyed with 1½ lb. of Indigotine in the synthetic dye.

We arrive now at the question of how this development of the indigo industry affects Ceylon, where it has never been considered profitable to grow the plant, even at the flood tide of prosperity in that industry. In those days the yearly outlay of an indigo factory—for supervision, rent of land, cultivation, manufacture, and the marketing of the dye—used to be in Behar about Rs. 36 per acre, and the outturn was 24 lb. of the dye per acre, selling at Rs. 3 per lb. This gave a cent. per cent. profit.

Cheapness of labour and cheapness of land were then the essential elements in the profitable cultivation of indigo, and on this basis Ceylon could not hope to compete with India. But now these items are not of such importance, since the industry has developed on lines which make it necessary to treble the outlay, so that the cost of labour and land is now proportionately much smaller. It is this change which enables Ceylon planters to take up indigo cultivation with every chance of success and profit. The increased outlay is chiefly due to the cost of scientific methods of manufacture, and the very large additional outturn of dye obtained thereby has reduced the cost of natural indigo of average quality (60 per cent. indigotine) to 1s. per lb. whereas the synthetic dye costs 1s. 6d. to manufacture, and is sold at present at 8d. per lb. of 20 per cent paste equal to 2s. per lb. of 60 per cent. indigotine

The way is, therefore, open for a revival of the natural indigo industry on a better basis than ever before, for it is well-known that the cost of the synthetic dye cannot be further reduced. It is generally acknowledged that natural indigo has better dyeing properties than the synthetic product, and dyers will give preference to the natural dye if they can get it at the same price of a standard quality and in the more convenient form of a paste. Such a standard natural indigo paste of keeping qualities has now been produced ; it has been tested by practical dyers, it has met with the approval of Mincing Lane brokers, and it finds a ready demand and sale at a remunerative price.

It will, of course, take some time before an indigo industry on these up-to-date lines is established even in Behar. But a beginning has been made there and it is to be hoped Ceylon will follow suit, for here there is no lack of enterprising men with a command of credit and ready money, which is essential. The climate is favourable, the soil is suitable, and, in short, we have here all the elements that should ensure success.

The indigo plant grows better in Ceylon than in Behar. It grows wild in the low-country and at high altitudes, it is found up to 5,000 feet, it grows in the dry districts and in the wet districts, and there are some sixteen varieties of *Indigofera* indigenous to the Island. The plant grows in Ceylon for the greater part of the year (excepting the very dry districts), and will yield three to four cuttings in the twelve months; whereas in Northern India, where there are four months of cold weather and three months of drought, only one good cutting can be obtained, the second cutting depending much on the season, and, at the best, yielding only a half crop.

Mr. Teixeira de Mottos, General Secretary of the Midden Java Planters' Association, has given me the crop outturn of *Indigofera arrecta* in Java as amounting per acre to 32,000 lb. per year for three cuttings, the yearly outlay being Rs. 100 per acre. This crop outturn of green could, I feel certain, be reached here also in Ceylon, whereever the rainfall is over 60 inches for the year, and where the fall is well divided between the south-west and north-east monsoons.

In the dry districts of the Island, with only one monsoon, and a rainfall of only about 40 inches spread over four to five months of the year, we can only expect two cuttings, which might be estimated to yield about 20,000 lb. of crop per acre, for in Behar I have the statistics of a crop of *Indigofera arrecta* sown on March 20, and yielding before the middle of September, within a period of six months two cuttings amounting to 21,600 lb. per acre.

If we take for Ceylon a rather higher outlay per acre than in Java, say Rs. 120 per acre, and add to this the expenditure in working according to scientific methods of manufacture (say Re. 1 for every 400 lb. of crop treated) we arrive at a total outlay, for a yield of 32,000 lb. per acre of Rs. 200 per acre, and for a yield of 20,000 lb. crop Rs. 170 per acre. The outturn of dye for Ceylon may be safely estimated at about the same as that obtained in Behar by scientific methods of manufacture, *i.e.*, 2½ lb. of standard indigo paste per 100 lb. of green plant, though actual manufacture from plants grown in Ceylon has shown that the yield of dye is higher than in Behar. Arrangements have been made with a Mincing Lane firm to take over this standard paste at the rate of 50 cents per lb. c.i.f. Colombo.

The outturn of standard paste per acre yielding 32,000 lb. green plant may therefore be estimated at 800 lb. of paste, value Rs. 400, plus Rs. 148, the estimated value of the residual manure which the decomposed plant yields after the dye has been extracted, making a total of Rs. 548 against an expenditure of Rs. 200. In the districts where only 20,000 lb. of green plant can be cut per acre, the outturn of standard paste will be 500 lb., value Rs. 250, plus Rs. 100, the value of the manure, or a total of Rs. 350, against an expenditure of Rs. 170.

There must further be deducted rent of the land (or interest on the capital represented by it) and also the interest on the capital invested in the building of a factory and depreciation.

With the assistance of a few enterprising men in Colombo, this question of the possibility of successfully pioneering in Ceylon an indigo industry on up-to-date lines has been brought nearer torealisation. *Indigofera arrecta* and *Indigofera sumatrana* have been experimentally cultivaed during the last six months in gardens within Colombo city, as well as at higher elevations on coconut and rubber estates. The plants have grown satisfactorily, as could not otherwise have been expected, for indigo is a weed which will flourish well with ordinary cultivation in all tropical and semi-tropical countries. Even where it was sown broadcast on totally unprepared hard laterite soil a crop has been obtained, though the growth is irregular.

What was sown in Colombo in July last has already yielded two cuttings (the second cutting at the rate of 14,500 lb. per acre), and the plants are shooting out well for a third cutting.

Plant grown in the Kalatara district has been manufactured in a miniature factory according to scientific methods and has yielded well, the outturn of dye being much greater than the Behar plant yields, and was equal to 3¾ lb. of standard paste for 100 lb. of green leaf.

You will have noted that I have added to the value of the dye the estimated value of the manure, which is a by-product of indigo manufacture. This is a most valuable asset, especially for Ceylon, where the soil cries out for manure more and more every year. The fact that indigo cultivation and manufacture will yield as a by-product one of the most valuable of natural manures is one pregnant with the greatest possibility for this Colony.

We know from the experience gained in India and Java that this manurial matter trebles the outurn of tobacco; that it doubles the outurn of paddy, in grain as well as in straw; and it will also be found very suitable for coconut cultivation, for caçao, and for tea.

The manure, consisting of the fermented green leaves and stalks, is put into heaps and kept in pits, and can be further improved in value by running the waste liquid after fermentation over it. The bacterial life, set going by the fermentation, helps to decompose the plant, and turns the whole mass into a brown friable mould. Sir George Watt, in his *Dictionary of the Economic Products of India,* specially refers to the great value of this manure, and you will find the fact mentioned there that experience has shown that land cutltivated in indigo is greatly benefited thereby.

Indigo is one of the few plants which enrich the soil on which it is grown, (1) by the exudation into the soil of nitrogenous matter from peculiar root-nodules in which through bacterial action the inert nitrogen of the air is worked up into assimilable nitrogenous products; (2) by the fall of leaf; and (3) by the droppings of the millions of insect life which an Indigo field harbours, while the long tap roots of the plant draw nourishment from strata of soil not reached by ordinary crops.

This Indigo refuse is called "seet," and closely approximates in its general composition good English Farmyard manure, though it is decidedly richer in its chief constituent—nitrogen. From 100 maunds of green plant about 80 maunds, or about 3 tons, of well-rotted "seet"are obtained. Mr. Pawson, from whose report to the Behar Planters' Association, pages 9-12, I quote, says that without taking into consideration the very valuable manurial qualities of the decomposed organic matter in the "seet," its principal plant food constituents per ton would be equivalent to 103 lb. sulphate of ammonia, 36 lb., sulphate of potash and 13 lbs., tribasic phosphate of lime.

Compared with oil cake, which contains only 14 per cent. of moisture, while "seet" contains 70 per cent., one ton of "seet" is equivalent in manurial value to about 5 cwt, of castor cake. The actual results are, however, even greater in the case of "seet," as the plant food there is in a more assimilable and subdivided form than in either farmyard manure or oil cake. Composition of Indigo refuse or "seet":—

	Per cent
Water ...	72·56
Organic matter ...	22·88
Mineral matter ...	4·56
	100·00

Containing nitrogen	...	0·98	
Equal to ammonia	...	1·19	
*Containing -			
Silica	...	1·04	
Lime	...	1·09	
Magnesia	...	0·21	
Potash	...	0·89	
Phosphoric acid	...	0·27	
Phosphoric acid equal to tribasic phosphate of lime		0·58	(Rawson)

Rawson gives the actual money value of the "seet" from 100 maunds (=8,000 lb.) of green plant as amounting to Rs. 37.

From an outurn of 32,000 lb. of green plant per acre we may therefore expect, in addition to the dye, a residual manure worth Rs. 148. The amelioration of the soil, as a concomitant of indigo cultivation, has been recognised as one of the most important elements of the industry in India, and should receive the same recognition in Ceylon.

I trust that the data I have given will draw the attention of Ceylon planters to the cultivation of a product which, even grown as a subsidiary crop, opens such large possibilities for the more successful cultivation of the present stable products of the Island.—*Ceylon Observer*, March 7, 1912.

PRUNING.

Pruning consists in removing any part of a tree, either stem, branches or root with a view to repressing its growth in one direction, and directing the course of sap towards other parts of the tree or shrub, etc, which are better situated and constituted for performing the natural functions.

In this country, trees and shrubs generally, produce an overabundance of branches, half of which are sufficient for all purposes required, decorative or otherwise. It is therefore essential that pruning be resorted to. By pruning I do not mean to infer that in the case of such trees as Cassia fistula, etc., wholesale, ruthless cutting out of branches is required, far from it, but if a few of the weaker branches were removed, the sap which would have been utilised by the removed branches, is directed into the remaining branches, strengthening and enlarging them so that they are better able to continue the satisfactory growth of the tree.

In fruit trees generally, pruning has a most beneficial effect on the yield of crop, enlargement of the fruit, general productiveness of branches hitherto barren, and admission of more light and air to the remaining branches are some of the immediate results attained.

Pruning may be performed with a pruning knife, secateurs, parang, or small hand-saw, but in all cases the branch should be removed as close to its base as possible, leaving a clean, slightly sloping cut. Cover the scar completely over with coaltar, taking care that no tar is allowed to trickle down the bark of the tree. As any unprotected wound or scar is liable to introduce fungi to the tree, it is better to apply the tar two times, i.e., once immediately the branch has been removed and again about a fortnight later. Never leave scars or cuts unprotected for any length of time.

If it is decided to remove some of the branches say of a Mangosteen tree, then immediately the fruit has been gathered is the best time to do so. This allows the remaining branches to enjoy, during the whole of the following growing period, the additional supply of sap thus caused, and consequently the tree produces larger and better fruits the ensuing season. When one sees the numerous inferior Mangosteens placed on the market, it is surprising that some such method of thinning out of the branches has not been practised. Neglecting to thin out the weaker branches is one of the causes by which we get an enormous crop of medium-sized fruits one season followed by a more or less dearth during the next season. Even in this country where growth is extremely rapid, a tree cannot be expected to yield large crops of first class fruits regularly each season, unless some such method of thinning out of branches is adopted. The Chiku (Achras sapota) is another fruit which would be immensely improved by the judicious removal of many of the weak branches

The first thing to be done when pruning trees, shrubs or any sort of plant is commenced is the removal of all dead and dying branches (even if nothing else is done, all such branches should be removed as soon as they appear.) All the weak and useless shoots should then be removed. In pruning ornamental trees or shrubs one must endeavour to preserve the natural symmetry of the plant, but if as is often the case, one branch has a tendency to outgrow its neighbours, then it may be pruned about two feet lower than the tips of the others. If, however, on branching again it still has the same tendency, it should be removed altogether as this excess of growth is probably due to its being in direct contact with a large and strong root.

Shade trees and roadside trees in particular require frequent prunings to obtain the necessary amount of shade with the minimum amount of waste branches. To do this, one must commence pruning shortly after they are removed to their permanent quarters. In many instances, young trees are lifted from the nursery beds and planted without the least care and forethought. Preparations shou'd be made some time beforehand so that the roots are exposed to as few drying influences as possible.

Seedling trees have usually one main shoot which varies in length according to the vigour of each particular variety. If such a tree as this be lifted and planted, in all probability the leaves shrivel and die, causing the death of the shoot two three feet from the tip. It takes some considerable time for the tree to recover from such a check and also produces an unnecessary, amount of lateral branches. If, however, the tip of such a tree be removed until firm wood is obtained (usually about 6 inches) some ten days before planting, the axillary buds will have become plump and active. Planting may then be carried out with much less danger of checking the growth of the tree and almost immédiately continue its growth.

The subsequent lateral branches must be pruned or removed according to the purposes the tree is desired to fulfil, but in order that there be as little waste of sap as possible, they should be removed when quite young.

Ornamental and flowering shrubs require frequent pruning. In the case of the former, sufficient only should be removed to preserve the shape of the shrub unless it has become scraggy, when severe pruning is necessary. For the latter the secateurs may be used frequently and more drastic treatment may be given them.

The pruning of flowering shrubs can be done immediately the flowers have faded but the best and most favourable time to do so is is at the commencement of the rainy season. They may then receive a severe pruning without causing so great a check as when done at any other time of the year.

When a shrub or tree has been pruned, it should immediately receive a liberal dressing of manure, either by mulching or by digging it lightly into the soil. Well decayed leaves and old cow-manure mixed together is the most suitable manure for this purpose.

The following list comprises a few Ornamental and flowering plants which require such pruning:—*Acalyphas; Angelonia salicaraefolia; Aristolochias* (a few); *Beloperone oblongata; Bougainvilleas; Brunfelsia; Clerodendrons; Congeas; Crossandra; Daedalacanthus; Duranta; Eranthemum* (except *E. Malaccensis*); *Cryptostegia; Excaecaria bicolor; Galphimia glauca; Graptophyllum* (Caricature plant); *Hibiscus* (all); *Holmskioldia; Ipomoea carnea; Ixoras; Jasminum* (slight); *Jatropha; Lantanas; Murraya* (slight); *Mussaendas; Quisqualis indiga* (Drunken sailor); *Nerium; Palicourea gardenioides; Petraea volubilis; Plumbago rosea* (frequently); *Rondoletia odorata* (slight) *Russelias; Sanchezia nobilis; Panax fruticosus* (all vars.); *Strobilanthes Dyerianus; Tecoma stans; Thunbergia erecta*: and *Wormias.*

J. W. ANDERSON.

IN UNKNOWN PAPUA.

MR. STANIFORTH SMITH'S TOUR.

London, Feb. 16.

Mr. Staniforth Smith, Administrator of the Territory of Papua, lectured this week before the Royal Geographical Society on his recent adventurous journey through the Western District of Papua. Here are some notable results of his adventures which prove that the terra incognita consisting of huge up-raised coral beds has a larger area of elevated land than any other discovered in the territory.

The Natives.

The description of the country given postulates a somewhat sparse population over this elevated portion of the Western Division. At Sambregi, immediately to the north-west of Mount Murray, are a cluster of villages with an aggregate population of about 1,000 people. Throughout our trip we saw only one other village of any size, which we reached on December 27th. This was on a large tributary of the Kikor flowing south of east. In every other instance the tribe or clan lived in one communal dwelling, varying in dimensions according to the size of the community, and capable of housing from ten to seventy people. These dwellings, especially the smaller ones, are generally hidden away or perched on steep ridges, that are not easy of access, probably from motives of defence. The population of this area of elevated land is estimated at 15,000 inhabitants, or about one and a quarter persons to every square mile.

The native inhabitants of the interior do not appear to be a homogeneous people; racial distinctions are apparent that seem to indicate a mingling of Papuans and Papuo-Melanesians, to use the terminology of Dr. Seligmann. Some of the inhabitants of a village were dark-skinned, dolichocephalic men, with wiry frames and somewhat slender limbs, and, in disposition, rather morose and unemotional. In not a few instances the somewhat prominent nose was arched, presenting the appearance of the so-called Semitic type. Other villagers again were unusually light skinned—more the colour of a Samoan. The high altitude might accentuate this. I was unable to obtain the cephalic indices of any of the natives, as they were very shy, and we could not afford to make a long stay anywhere. The faces of the light-skinned men were broader and shorter than their darker neighbours, their limbs stouter, and they appear to be more vivacious and intelligent, and also to be fonder of ostentation in the shape of ornaments and paint. The Melanesian migration into New Guinea is believed to have advanced along the north-east coast as far as Cape Nelson, where their progress was stopped by the warlike Binandili tribes; and along the southern coast till they reached the populous villages of the Gulf country. It is, however, not yet known how far the immigrant race penetrated inland. Certain of the inhabitants of the main range near the Gap, at Mount Albert Edward, and on the Chirima, as well as in the neighbourhood of Mount Yule, are lighter skinned and broader headed than the Papuan, and it is possibible that the Melanesians have gradually diffused themselves inland along the southern slopes of the main range, where the original inhabitants were few in number, and therefore less able to successfully resist the advance. The greatest obstacle would be the natural features of the country, which would necesitate very slow progress. This might account for the marked distinction in physical characteristics which have not yet been obliterated by miscegenation. The light skinned people were nearly always in a minority. Mr. J. P. Thompson, in his book, 'British New Guinea,' speaks of the "remarkably light bronze colour," of some of the natives of the upper Fly river.

I obtained a small vobabulary—principally substantive nouns—from the Sambregi tribes, immediately to the northwest of Mount Murray, in the hope that it would contain sufficient information to enable philologists to determine if the language was Papuan or Melanesian; unfortunately, this was lost with all other papers in the Kikor river.

By exercising great forbearance and patience, we were fortunately successful in making friends with these bushmen everywhere. As they had never seen white men before, our arrival caused great excitement. At the first small communal dwellings we reached they all turned out with their bows and arrows, and stood shouting their war cries. They naturally thought we were a marauding party, and naturally, and rightly they were prepared to defend their wives and children and homes. While they were in this condition of extreme excitement our party sat down, and, although our arms were ready for any emergency, appeared to take no notice of them, except to hold up some red cloth. They then retired, and, when some presents were sent up to the house, we found that they had all fled, the hostile demonstration being probably to allow the women and children time to get away into the jungle. Great care was taken that nothing was touched, and a tomahawk, a knife, and some red cloth were left in the house. Not seeing them return, we started on our march next morning, and in the afternoon were overtaken by the natives, who, when they found that we had no desire to hurt them, evinced the greatest joy, and made us presents of food. After that for some days we experienced little trouble in establishing friendly relations with the natives we met. Possibly, by some bush telegraphy they had notified the other tribes that we had no desire of injuring them. In many instances the friendship of the natives was of great service to us. Not only were we able to buy food, but they showed us native tracks, and, in one instance, took the whole party over a wide river in their canoes.

The inhabitants of the Sambregi villages were particularly interesting as they live at an elevation of 6,000 feet above the sea-level, the highest elevation, I believe, of any Papuans so far visited. The physique of some of the young men was magnificent, the Kagi men of the main range approaching most closely to them in this respect. While the tracks between the villages of Sambregi were in wretched repair, and the houses below the standard of native dwellings in Papua, these people excelled in drainage schemes. The gardens in the rich low-lying portions of the valley are drained into the Sambregi creek by water channels varying in depth with the contour of land. In some cases the drains are as much as 8 feet in depth; no water lodges in them, and they are kept in excellent repair. With the exception of the native irrigation channels near Dogura in the Eastern Division, in no other part of the territory*do the natives show such knowledge of channel construction. Although it is most improbable that any of these bushmen have ever seen the sea, it is evident that they are able to carry on some trade with the coastal men, probably through many intermediate tribes, as we found them wearing sea-shell ornaments, and possessed, in some instances, of iron implements, such as a much used axe blade and plane irons. • They also knew the names of the Kikor, Turama, and Bamu rivers, but their ideas as to the directions of same were sometimes far from correct.

While these far-inland bushmen are probably cannibals, we were unable to find any direct evidence. At Sambregi, one youth had a skull hung round his neck, and one man a pair of human jawbones; these, however, many have been the remains of relatives. In their dubus, or communal dwellings we saw no skulls or other human bones, although the jaws of pigs and other trophies of the chase were in evidence.

It appears that the natives bury their dead, and, at any rate in some instances, dig up the bones at a later period and put them on platforms. In one instance we saw a tiny house like a small dove-cot built on piles about 6 feet from the ground. In this was a skull painted with red ochre, and some bones. We also saw a platform recently erected, and the natives indicated that it was for human bones. In a rock shelter we saw two skulls and bones placed side by side in a circle of stones; close by were evidences of a grave having been opened and bodies exhumed.

For clothing the natives wear a piece of netted cloth hung down from the waist in front from a wide girdle of bark; at the back dried grass or the bright coloured leaves of a plant. In other instances, tapa cloth was hung from the waistband. As a head-dress they wore the black plumes of the cassowary, or the feathers of the white cockatoo; very occasionally we saw the plumes of the raggiana bird of Paradise. Their hair was usually worn short in front and long behind, clotted into tags and rolls, either with oil or honey and wax of the little black stingless bees. The hair is not bleached with the lime as in other parts of the territory. They wore cane armlets, anklets, and waistbands. These canes were used for fire making. The septem of the nose is pierced and the lobes of the ear, and various things hung thereon from a pencil of bone to circular pieces of cane and the claws of birds. It is remarkable that during our whole trip we saw no evidence of tattooing nor any cicatrices or mutilation of the body. Skin disease was exceedingly rare, and only seen in one or two instances in the adults, and rather more frequently amongst the children. In fact, the natives generally were a remarkably healthy lot of people. In time of war, and probably on festive occasions, they paint themselves either wholly or in part with yellow or red clay, or with ground charcoal and oil. The women wore a tapa cloth rami from waist to knee. They also have tapa cloth cloaks which cover the head and reach to the ground; this I have seen nowhere else in the territory. In their dubus or communal dwellings they keep rolls of tapa cloth blankets as the nights are cold on the great plateau.

They have no pots or cooking vessels and consequently all their food is roasted over the fire; the only exception I saw was in the case of the leaves of an oleaginous plant which they boil as a vegetable in bamboos. We saw no evidence of polygamy, and the probability is that it is not largely practised. From the inhabitants we saw, the women folk seemed less numerous than the men but this may have been owing to the warriors keeping them in the background. Children seemed fairly plentiful. The time of the men is principally occupied in clearing ground for gardens, hunting the pig, cassowary, and flying fox, building houses, making weapons, and cutting down sago trees. The women make all the sago—a continuous and exacting occupation—look after the gardens, do the cooking, and carry water required for household purposes in bamboos. They also hammer out the tapa cloth from the bark of a tree, and look after the rising generation.

These bushmen are certainly not a nomadic people. Their buildings are substantial, and, in every instance, they had a considerable garden and a number of village pigs. Their weapons consist of the bow and arrow, a heavy pig spear which is not used for throwing, and a man-killing club. Very rarely we saw stone clubs; these had probably been introduced from the coastal districts. The bow and arrow men wore plaited gauntlets from wrist to elbow on the right arm. The stone axe and adze are largely used. The natives do little carving except on their arrows (which are made of bamboos often tipped with bone or a cassowary's claw), spears, and wooden clubs. They also carve out wooden bowls to hold water; these have no ornamentation. The tribes on the western portion of the plateau seemed to be at war with each other during our visit; they were frequently met in full war paint; with bundles of arrows and killing clubs; in one instance they informed us by signs that they were on their way to fight a neighbouring tribe. Possibly, constant internecine strife keeps their numbers down, and accounts for the comparatively sparse population, as the climate is bracing and healthy and the natives singularly free from disease and full of vigour.

Their method of making fire is superior to the usual Papuan system. They get a piece of dry soft wood, split one end and insert a piece of tapa cloth, then taking a piece of cane, which they carry twisted round their waists, they place it under the wood on which they stand. Grasping each end of the cane, they pull it backwards vigorously; when it has eaten halfway through the wood to the tapa cloth the heat generated is so great that the cloth smoulders and is blown into flame. The whole process is accomplished in ten or fifteen seconds. I am informed that certain natives on the main range about Kagi adopt this system also; if so, it is interesting as possibly shewing some connection between them.

With the exception of two large villages, all the natives we saw were split up into small tribes, and each community has one communal dwelling, varying in size, according to their numbers, which would probably range from ten or fifteen up to seventy or eighty.

The dwelling is erected on a forest of piles composed of thin but durable wood, and is elevated from 10 to 12 feet above the ground. The sides of the great living room are only about 4 feet high, and the pitch of the roof is low. The roof is made of the fronds of the sago palm, each separate leaf being doubled round the rafters (which are only about 6 inches apart), and sown with native fibre to keep it in its place. At one side of the entrance is a partition, which does not reach as high as the roof; this divides the house lengthways into the men's quarters on the one side, and the women's and children's on the other. In each subdivision there is a gangway the whole length, and on one side of each a raised floor which is sub-divided alternately into sleeping platforms and fireplaces, each about a yard in width: above the fireplace is a platform filled with wood, and above each sleeping place another platform on which the men keep their weapons and other effects, and the women their tapa cloth, bamboo drinking vessels, and food supply. The dogs share the buildings with the natives. The house is generally surrounded by a garden. Variations of the above were seen. Near Mount Murray there were two additional rows of sleeping platforms and fireplaces on the ground level, one on each side with a separate entrance for each. Again, about 300 miles up the Kikor at the largest dubu we had seen (which we estimated was 70 yards in length) the partition, instead of running lengthways, was across the centre of the building dividing the men's and women's quarters. We have travelled down the Kikor about 116 miles to this point before we came upon the first coconut trees we had seen on our journey, nor did we see any more until we reached the mouth of the Kikor. We found that the language or dialect of the people was continually changing as we advanced. At the Sambregi a vocabulary of the most useful words, principally substantive nouns, was compiled; this, besides being of philological interest, we hoped would be of use to us in communicating with the natives we subsequently met; we found, however, that after advancing about 20 miles, the dialect changed, and very few of the words could be understood. Further on the language was quite different.

While the many tribes of natives we met on our exploration showed no suspicion and absolute confidence in us, after we had succeeded in establishing friendly relations, frequently coming to our camp and sitting round the fire at night, and bringing their women and children to see the "pale faces" during the daytime, they all without exception, refused even to taste any food we offered them, although they would take it and wrap it up in leaves, probably as a curiosity. This refusal may indicate that they possessed a knowledge of poison (we saw a fish-poison tree in one of their gardens), it may, on the other hand, have risen from a fear of "pouri-pouri" or witchcraft, or again, it may be that they were conservative in their commissariat and did not care to eat new foods they were not accustomed to.

Climate.

The climate of the plateau was cool and bracing, the nights being sharp and cold. This doubtless accounts for the healthy appearance of the people who also gave evidence of greater activity than the coastal races. The rainfall on the eastern portion of the plateau was heavy and of almost daily occurrence, generally commencing about four o'clock in the afternoon. As we advanced west the rainfall became less frequent and torrential, only falling on an average about three or four times a week. This might be accounted for by the great distance we were from the sea.

Coal.

There is every probability of beds of good coal being found on the borders of the great plateau, although I do not think that any minerals of value will be found in the elevated region caused by the upheaval of the coral beds. Coal has been found on the upper waters of the Purari by the Mackay expedition, and it was found by us both on the lower and upper waters of the Kikor river. On the upper waters of the Kikor there is undoubtedly a very extensive field of excellent coal. Unfortunately, the large number of specimens we were bringing down were lost when the rafts capsized. We followed down a creek for some days that brought us to the Kikor. Everywhere the beds were strewn with lumps of good-looking, bright, hard coal, and for about 15 miles down the Kikor coal was seen in almost every little creek and waterway, as well as on the banks of the river. The attempt to develop this field by the Kikor waterway is evidently impossible, as for 120 miles the river is one succession of rapids, whirlpools, and gorges. There is no reason why this coal-field should not extend further west, in fact a seam of coal was seen on the western side of the river, and, if so, it might be worked from the Strickland river, which it was estimated could not be more than 20 miles distant.

The coal we found on the lower Kikor was one isolated lump considerably weathered. However, as the creek was a very small one, running northward for only a few miles, it is evident that the seam from which it came could not be far off, and, when a magisterial station is established on that river, a fuller investigation might be made. If a large bed of good coal could be found here, I believe barges might be brought up the river to within 6 or 7 miles of it, although two very small rapids occur on the route. These run swiftly when the river is high, but are barely noticeable when the river is not in flood.

Flora.

The whole of the country traversed was covered by dense jungle and scrub, and we literally had to cut our way through the 374 miles traversed on foot, except where we occasionally met a native track going in the desired direction. It was surprising that over rough coral ranges and valleys, trees of considerable size and dense scrub could find a roothold and sufficient nourishment. The roots spread all over the surface of the rocks, constituting steps and ladders up the steep mountain-sides, without which their ascent would have been most difficult. A remarkable fact was that we saw no grass whatever, except a little reedy grass near the rivers during our whole trip.

Of the economic flora, by far the most important was sago (Sagus Rumphii). We found these useful storehouses of nourishing food growing as far north as we penetrated, and up to an elevation of 3,500 feet. It had previously been considered that sago only grew along the coast and in the alluvial mud of riverbanks near the sea-level. This constitutes the staple food of all the inland natives we met, except the inhabitants of the Sambregi villages, who live principally on sweet potatoes, the elevation (6000 feet) being too great for sago. Wild breadfruit trees are fairly numerous. The fruit, unlike the Samoan breadfruit, is full of large seeds nearly the size of walnuts. These, when roasted, are palatable and make a good substitute for potatoes. The natives when hungry eat the pith of a small palm that grows plentifully over a large area of the country traversed by us. In time of scarcity our police and carriers consumed a good deal of this. To our palates it had a watery and woody taste that was far from agreeable; in fact, when hungry I tried to eat it, but in each instance it made me sick. I collected the seeds of several indigenous fruits, which, while not palatable, might have been improved by cultivation, but these were lost with other things.

Cultivated in the native gardens we found sweet potatoes, taro, yams, sugarcane, bananas, betel-nuts and ginger, the last-named cultivated as a medicine. Maize is unknown. No coconut trees were seen on the whole trip until we reached the lower waters of the Kikor river, nor are there any mango trees or tapioca. The natives grow a green vegetable, the leaves of which they boil in bamboos. It makes a very good substitute for cabbage and appears to contain a lot of vegetable oil.

Tobacco is cultivated in every native garden, which might lead one to suppose it was indigenous; the name, however, tends to show that it is an introduced plant. It is universally called "Saku" by the bushmen, which is evidently derived from "Kuku," the coastal name. In one of the gardens on the headwaters of the Kikor I found a Kava plant (Macro-piper methysticum) although I saw no evidence of the manufacture of the beverage.

Fauna.

The wild pig, judging by the amount of ground that is rooted up, is plentiful everywhere. It is the chief source of meat-supply for the natives, and is continually being hunted with dogs, the killing weapons being bow and arrow and spear. The only animals domesticated are the pig and the dog. The wallaby is very scarce, owing to the absence of grass. Cassowaries are fairly plentiful, their back plumes forming a favourite head-dress. Flying foxes are very numerous. Their flesh is much relished by the bushmen. Tree-rats were occasionally seen, and the streams abound in fish of excellent quality. Two or three were shot with a rifle, but as we had neither fishing lines nor nets, this luxury was usually denied us. The natives catch the fish by spearing them and by fish-traps composed of stones or pickets across the streams. The little black stingless bee is common everywhere, and the honey and comb is much prized for food and as a dressing for the hair.

Cockatoos, both black and white, and pigeons were plentiful. Those wonders of avian architecture, the play grounds of the bower bird (Amblyornis subalaris), were seen on Mount Murray, at an elevation of 7000 feet. Of insect pests, the land leeches were very troublesome. The feet of the police and carriers were often red with blood from their bites. We tried painting their feet with sulphur ointment, but it proved quite useless. Scrub itch was very bad, except in the valley of the upper Kikor. The scrub itch is caused by a minute red insect that buries itself under the skin. Mosquitoes did not trouble us while on the highlands, but both they and sandflies were very troublesome on the Kikor river.

The "leaf" or "stick" insects were fairly plentiful, and in some instances their resemblance to the plant life in their immediate environment was wonderfully accurate. One insect resembled a stick covered with green moss; the green colouring appeared so exactly like moss, that a member of our party refused to believe it was not actually moss until he had examined it with a magnifying glass.

On the map accompanying this report the course of that portion of the Kikor river lying to the west of the 114th meridian of east longitude is only approximate, as, while descending this river, most of our instruments were lost, and the compass-bearings and estimated speed could not be checked by observations for latitude. In addition to which the great difficulties that beset us on our return journey did not permit of the careful mapping previously undertaken.

The most important results of the exploration were:—

(1) We went practically right across the centre of the unexplored portion of the territory of Papua, travelling approximately 524 miles through totally unexplored country (374 miles on foot and 150 by river.)

(2) We ascertained that instead of the Western Division of Papua being low-lying recent alluvial country, as previously supposed, it is (except along the coast and in the vicinity of its navigable rivers) an upraised plateau having an area of approximately 12,000 square miles, the lowest valley being over 2,000 feet above sea-level.

(3) The upper waters and watersheds of the great rivers emptying into the Papuan Gulf are now roughly defined, thus completing our knowledge of the river system of the territory.

(4) We have now data for estimating the population of the whole territory with some accuracy, the hinterland of the Western Division being formerly an unknown quantity.

(5) We found coal deposits in two places along the watershed of the Kikor river, the coal country along its upper waters being very extensive.

(6) We found sago growing inland as far as we penetrated and at an elevation up to 3,500 feet.

(7) We established friendly relations with the natives everywhere, and were successful in avoiding all fighting. *Singapore Free Press*, 15th and 16th March, 1912.

Before proceeding to Papua as Administrator Mr. Staniforth Smith spent some time in Ceylon and Singapore, studying the agriculture and Economic Botany. From Singapore many cases of useful plants were taken for introduction to Papua and seeds are periodically communicated.

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LEWIS AND PEAT'S RUBBER REPORT.

February 15th, 1912.

The market since our last report has been very steady and a fair business done.

Hard Fine done up to 4/7½ for March/April, delivery and 4/7¾ for April/May. At the close, however, prices are a little easier and there are sellers of these positions at a farthing per lb. less.

Soft Fine—very quiet with nothing offering under 4/7 per lb.

Peruvian Fine—value to-day 4/6. Ball—sellers of spot 4/-, March/April 3/11, buyers 3/10½ per lb.

Medium grades are in good demand, but there is very little offering.

Plantation Grown Para—a fair business done privately at very steady prices. Feb./March done up to 5/3½, Feb./July 5/3, April/June 5/2 and 5/2½, July/Sept. 5/- and 5/0½ per lb.

Particulars of the Auction as follows:—

INAMBARI.—26 Pkgs. offered and sold. Fair average unsorted 4/3¼, fair scrappy part sticky 3/6½ per lb.

MANGABEIRA.—88 Pkgs. offered and 16 sold. Pressed sheet fair 2/9½ per lb.

MOZAMBIQUE.—253 Pkgs. offered and 153 sold. Rough Nyassa.

NYASSALAND, ETC.—Biscuits 4/8¾ and 4/9¼, red and whitish pressed ball 4/3 and 4/4, washed rooty 3/6 and 3/9½, washed crêpe 4/5, thin rather rough Ceara sheet 4/5½ per lb.

CENTRAL AMERICAN.—32 Pkgs. offered and 16 sold. Dark Brown rather barky scrap 3/8½ and 3/8¼ per lb.

MANIHOT.—85 Pkgs. offered and sold. Good clean pressed crepe 4/8½ and 41¼, dark pressed mixed whitish 4/3, pressed whitish smoked 3/9¼ per lb.

CONGO.—30 Pkgs. offered and sold. Pressed red and whitish ball, part heated 3/6¾ per lb.

The following were offered and bought in:—

MANICOBA 200, MADAGASCAR 18, AFRICAN 35, PERNAMBUCO 20, & MALAYSIAN 28 PKGS.

PLANTATION. At the sales held on the 13th and 14th inst., about Grown Para, 9241 Pkgs. comprising about 400 tons Malay, 110 tons Ceylon and 5 tons Java were offered. Prices opened about a penny under those prevailing at the last Auctions; later however, rates hardened and the decline was fully regained, although at the close prices were again slightly easier.

CREPE.—Fine blanket 5/3¼ and 5/4¼, pale and palish 5/2½ and 5/4¼, light 5/1¾ and 5/3¾, light brown and mottled 5/1½ and 5/3½, brown and dark brown 5/½ and 5/3, dark and black 4/10½ and 5/½, specky and barky 4/9¼ and 5/-, smoked 4/11¾ and 5/2¼ per lb.

BISCUITS & SHEET.—Fair smoked sheet 5/2½ and 5/4¾, fair average 5/2 and 5/3, rather rough 5/¼ and 5/2, per lb.

SCRAP.—Fair 4/5¾ and 4/6¼ per lb.

RAMBONG.—Crepe 4/5¾ and 4/7¼ per lb.

LANADRON.—Block 5/4 and 5/4¼ per lb.

CASTILLOA.—Sheet 4/3½ per lb.

GOW, WILSON & STANTION, LTD.

India Rubber Market Report.

February 15th, 1912.

Since the last auction the market has assumed a rather quieter tone, but prices have only shown very slight variations.

At the sale held this week, the amount advertised was about 120 tons less than a fortnight ago.

In sympathy with the private market, the sales opened with rather quiet competition, but all through the auction the tone steadily improved, and while at the beginning quotations were 1d. to 1½d. below those of a fortnight ago, by the end of the sale the whole of this discount was made up, and rates, especially for Crepe, often marked a slight improvement on those of the end January sale.

The highest figure was 5/4¾ for one parcel of Highlands sheet, 5/4¼ being frequently paid for light Crepe on the second day of the sale.

As will be seen from the figures published overleaf, the total exports of Plantation Rubber from the East during 1911 amounted to nearly 14,000 tons.

		Malaya Etc.	Ceylon.	Total.	No. Pkgs. Sold.	Average Price Plantation Rubber.	Fine Hard Para.		Fine Plantation.
							Tues.	Wed.	
February 13th and 14th	No. Pkgs.	7124	2150	9274	9080	5/1⅞	4/7	4/7¼	5/2¾ to 5/4¾
	„ Tons	411	98	509					
Corresponding Sale Last Year	No. Pkgs.	4994	1086	6080	5150	6/1⅞	6/2½	6/2½	6/1 to 6/11¾
	„ Tons	277	48	325					

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Month of February.

			Wired.	
	Steamers.		Feb. 15 Tons.	Feb. 29 Tons.
Tin	Str. Singapore & Penang	to U. Kingdom & or	1.660	1,355
Do.	do.	U. S. A.	1,056	405
Do.	do	Continent	395	285
Gambier	Singapore	Glasgow	...	10
Do.	do.	London	10	...
Do.	do.	Liverpool	120	...
Do.	do.	U. K. & or Continent	25	125
Cube Gambier	do.	United Kingdom	10	15
Black Pepper	do.	do.	...	...
Do.	Penang	do.	...	15
White Pepper	Singapore	do.	125	5
Do.	Penang	do.	30	5
Pearl Sago	Singapore	do.	50	15
Sago Flour	do.	London	75	200
Do.	do.	Liverpool	1.300	...
Do.	do.	Glasgow	125	...
Tapioca Flake	Singapore	United Kingdom	260	...
Tapioca Pearl & Bullet	do.	do.	120	...
Para Rubber	Straits & Malaya	do.	725	625
Gutta Percha	Singapore	do.	110	20
Buffalo hides	do.	do.	180	5
Pineapples	do.	do.	17,500	3,150
Gambier	do.	U. S. A.	275	150
Cube Gambier	do.	do.	...	10
Black Pepper	do.	do.	5	5
Do.	Penang	do.	25	...
White Pepper	Singapore	do.	20	15
Do.	Penang	do.	...	15
Tapioca Pearl	Singapore	do.	110	45
Nutmegs	Singapore & Penang	do.	40	4
Sago Flour	Singapore	do.	50	25
Pineapples	do.	do.	4.500	300
Do.	do.	Continent	8,750	2,250
Gambier	do.	South Continent	225	60
Do.	do.	North Continent	340	50
Cube Gambier	do.	Continent	30	35
Black Pepper	do.	South Continent	55	85
Do.	do.	North do.	20	35
Do.	Penang	South do.	75	30
Do	do.	North do.	...	...
White Pepper	Singapore	South do.	5	...
Do.	do.	North do.	15	5
Do.	Penang	South do.	5	10
Do.	do.	North do.	15	...

	Steamers.		Wired.	
			Feb. 15 Tons.	Feb. 29 Tons.
Copra	Singapore & Penang	Marseilles	400	150
Do.	do.	Odessa	...	50
Do.	do.	Other South Continent	540	150
Do.	do.	North Continent	300	580
Sago Flour	Singapore	Continent	1,700	550
Tapioca Flake	do.	do.	210	55
Do. Pearl	do.	do.	40	5
Do. Flake	do.	U. S. A.	...	...
Do. do.	Penang	U. K.	...	...
Do. Pearl & Bullet	do.	do.	170	250
Do. Flake	do.	U. S. A.	...	...
Do. Pearl	do.	do.	30	290
Do. Flake	do.	Continent	...	10
Do. Pearl	do.	do.	225	110
Copra	Singapore & Penang	England	50	...
Gutta Percha	Singapore	Continent	15	40
Tons Gambier ...	...	... ...	250	200
„ B. Pepper			280	230
Para Rubber	Straits and Malaya	U. S. A.	50	10
Do.	do.	Continent	50	40

SINGAPORE MARKET REPORT.

February, 1912.

		Tons.	Highest	Lowest.
Copra ...	...	3,198	10.70	10.20
Gambier Bale ...	...	460	10.45	9.95
„ Cube No. 1 & 2	...	102	15.85	13.50
Gutta Percha 1st quality	...	...	275.00	200.00
„ medium	...	...	140.00	90.00
„ lower	...	...	70.00	17.00
Gutta Jelotong ...	...	...	10.00	8.40
Nutmegs 110s. ...	...	...	25.00	24.00
„ 80s. ...	...	...	26.00	25.00
Black Pepper ...	...	511	22.62½	21.75
White „ ...	...	94	32.75	30.50
Sago Pearl, small ...	...	41	5.35	5.00
„ Flour No. 1 ...	...	3,820	4.36	4.15
„ „ No. 2 ...	...	628	1.75	1.60
Tapioca Flake, small	...	356	9.25	8.60
„ Pearl „	...	126	8.20	7.60
„ „ medium	...	225	9.00	8.50
Tin ...	...	2,145	96.90	96.00

SELANGOR.

Abstract of Meteorological Readings in the various Districts of the State of Selangor for the month of December, 1911.

DISTRICT.	Mean Barometrical Pressure at 32 Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Wings.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur ...	29.872	147.5	81.4	89.6	73.9	15.7	76.7	0.821	73.3	77	Calm.	11.06	2.66
Prisons „ „	...	...	...	...	...	...	...	...	...	...	...	14.28	2.27
District Hospital „	...	...	...	...	...	...	...	...	...	...	...	9.44	3.20
„ Klang	...	...	...	88.7	69.6	19.1	...	...	...	...	...	15.34	4.65
„ Kuala Langat ...	...	...	...	86.1	73.7	12.4	...	...	...	...	...	11.43	2.00
„ Kajang	...	...	...	84.5	74.8	9.7	...	...	...	...	...	15.28	1.74
„ Kuala Selangor ...	...	...	...	87.3	71.3	16.0	...	...	...	...	...	13.27	2.50
„ Kuala Kubu	...	...	...	89.4	70.9	18.5	...	...	...	...	...	13.92	2.82
„ Serendah	...	...	...	92.0	70.4	21.6	...	...	...	...	...	16.00	2.35
„ Rawang	...	...	...	91.6	72.5	19.1	...	...	...	...	...	13.66	1.75
Sabah Bernan	...	...	...	...	...	...	...	...	...	...	...	9.24	1.19

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 30th Jan., 1912.

G. D. FREER,
Senior Medical Officer,
Selangor, Negri Sembilan & Pahang.

SELANGOR.

Abstract of Meteorological Readings in the various Districts of the State of Selangor for the month of January, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Max'mum in Sun.	Mean Dry Bulb.	TEMPERATURE.			HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
				Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur ...	29.883	148.3	81.4	89.2	73.1	16.1	76.5	.826	73.2	77	Calm.	4.76	2.21
Prisons „ „	...	...	...	...	...	...	...	...	...	...	...	3.68	2.73
District Hospital „	...	...	...	...	...	...	...	...	...	...	...	4.58	1.57
„ Klang	...	...	...	90.4	69.6	20.8	...	...	...	...	...	3.25	0.93
„ Kuala Langat ...	...	...	...	88.0	73.0	15.0	...	...	...	...	...	5.73	2.24
„ Kajang	...	...	...	87.1	74.4	12.7	...	...	...	...	...	2.12	0.46
„ Kuala Selangor ...	...	...	...	89.5	71.6	17.9	...	...	...	...	...	1.66	0.60
„ Kuala Kubu	...	...	...	91.8	71.6	20.2	...	...	...	...	...	2.42	0.73
„ Serendah	...	...	...	93.3	70.8	22.5	...	...	...	...	...	7.81	2.92
„ Rawang	...	...	...	90.5	70.9	19.6	...	...	...	...	...	9.30	4.30
Sabak Bernan	...	...	...	...	...	...	...	...	...	...	...	2.65	2.15

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 26th Feb, 1912.

G. D. FREER,
Senior Medical Officer,
Selangor, Negri Sembilan & Pahang.

PAHANG.

Abstract of Meteorological Readings in the various Districts of the State of Pahang for the Month of December, 1911.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
District Hospital, Kuala Lipis	...	...	78.2	85.1	67.4	17.7	74.5	...	...	...	...	12.52	3.10
" " Raub	...	...	82.9	90.9	67.6	23.3	73.1	...	...	...	...	13.04	2.48
" " Bentong	...	...	80.3	88.5	70.5	18.0	74.0	...	...	...	...	17.07	3.00
" " Pekan	...	...	78.4	83.6	72.2	11.4	76.0	...	...	...	...	47.57	9.52
" " Kuantan	...	...	78.6	86.6	69.8	16.8	76.5	...	...	...	...	35.11	6.52
Dispensary, Temerloh	...	...	...	87.0	67.0	20.0	...	...	...	...	...	11.28	2.14
Sungei Lembing	...	...	...	84.0	73.6	10.4	...	...	...	...	...	35.44	86.2
Kuala Tembling	...	...	...	...	...	...	...	...	...	...	...	11.22	2.43

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 23rd January, 1912.

G. D. FREER,
Senior Medical Officer,
Selangor, Negri Sembilan & Pahang.

PAHANG.

Abstract of Meteorological Readings in the various Districts of the State of Pahang for the month of January 1912.

DISTRICT.	Mean Barometrical Pressure at 32° F.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing direction of winds.	Total rainfall.	Greatest rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
District Hospital-Kuala Lipis	...	...	79.5	87.0	67.1	19.9	74.5	...	...	...	...	7.09	1.95
„ „ Raub	...	...	82.6	91.8	67.5	24.3	73.3	...	...	...	...	5.52	1.92
„ „ Bentong	...	...	80.5	89.1	70.1	19.0	75.2	...	...	...	...	4.09	2.27
„ „ Pekan	...	...	80.3	84.9	72.2	12.7	74.6	...	...	...	...	8.31	2.68
„ „ Quantan	...	...	78.5	89.1	70.9	18.2	74.2	...	...	...	...	9.34	4.30
Dispensary, Temerloh	...	...	...	87.9	67.3	20.6	...	...	...	...	...	3.35	0.85
Sungei Lembing	...	...	...	85.8	72.7	13.1	...	...	...	...	...	10.66	2.44
Kuala Tembling	...	...	...	...	...	...	...	...	...	...	...	3.46	1. 3

Office of the Senior Medical Officer,
Kuala Lumpur, 4th March, 1912.

G. D. Freer, *Senior Medical Officer,*
Selangor, Negri Sembilan & Pahang.

PERAK.

Abstract of Meteorological Readings in the various Districts of the State of Perak for the month of January 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	...	105	82.22	93	69	24	77.13	865	...	79	...	12.49	4.94
Kuala Kangsar	...	...	80.61	92	68	24	75.06	809	...	80	...	5.09	2.32
Batu Gajah	...	95	80.63	92	70	22	75.47	813	...	78	...	4.31	1.35
Gopeng	...	...	80.11	92	67	25	74.06	760	...	74	...	8.72	3.79
Ipoh	...	...	81.91	93	69	24	76.27	830	...	77	...	4 09	2.00
Kampar	...	...	81.09	93	69	24	75.84	824	...	78	...	7.04	2.13
Telok Anson	...	...	81.50	93	69	24	77.18	875	...	83	...	3.96	2.67
Tapah	...	...	81.48	92	65	27	76.17	831	...	78	...	13.75	5.70
Parit Buntar	...	...	81.68	93	68	25	76.26	833	...	78	...	2.47	1.00
Bagan Serai	...	...	81.96	92	70	22	76.76	850	...	78	...	1.35	.54
Selama	...	...	80.94	94	66	28	75.07	792	...	76	...	7.57	2.96
Lenggong	...	...	79.90	90	65	25	75.07	8[illegible]6	...	78	...	5.88	1.50
Tanjong Malim	...	...	80.83	94	66	28	76.62	861	...	82	...	9.06	3 74
Grit	...	...	77.61	94	62	32	71.82	708	...	75	...	4.81	2.54
Klian Intan	...	...	...	...	...	...	...	...	...	...	...	4.87	2.37
Pulau Pangkor Laut	...	...	...	...	...	...	...	...	...	...	...	5.15	2.78
Kuala Kurau	...	...	...	...	...	...	...	...	...	...	...	2.65	1.75
The Cottage	...	...	...	...	...	...	...	...	...	...	...	8.46	2.70
Maxwell's Hill	...	...	...	...	...	...	...	...	...	...	...	8.71	2 30

OFFICE OF THE SENIOR MEDICAL OFFICER,
TAIPING, 16th February, 1912.

S. C. G. FOX.
Senior Medical Officer.

PERAK.

Abstract of Meteorological Readings in the various Districts of the State of Perak for the month of February, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	...	106	82.28	94	70	24	77.13	864	...	79	...	10.57	1 58
Kua'a Kangsar	...	...	82.00	94	70	24	75.83	811	...	74	...	5.17	1.75
Batu Gajah	...	...	82.11	93	70	23	76.27	828	...	77	...	9.01	3.86
Gopeng	...	...	80.87	92	68	24	74.80	784	...	74	...	6.68	1.97
Ipoh	...	...	82.87	94	70	24	76.23	816	...	73	...	5 74	1.86
Kampar	...	...	81 47	93	68	25	76 34	839	...	78	...	14.43	3.38
Telok Anson	...	...	81.68	93	69	24	77.18	867	...	81	...	10.41	2.10
Tapah	...	...	81.69	92	66	26	76.54	845	...	78	...	9.05	1 79
Parit Buntar	...	...	82.33	92	69	23	76.44	834	...	77	...	3.62	1 26
Bagan Serai	...	...	82.39	92	69	23	77.26	867	...	79	...	6.92	1 85
Selama	...	...	80.95	94	61	33	76.23	842	...	80	...	10.94	3.84
Lenggong	...	...	80.91	94	65	29	75.43	810	...	78	...	7.70	3.22
Tanjong Malim	...	...	81.82	94	65	29	77.11	863	...	81	...	5.31	1.75
Grit	...	...	79.33	97	62	35	71.75	680	...	68	...	3.32	1 79
Klian Intan	...	...	...	...	...	...	...	...	...	...	...	4.54	2.50
Pulau Bangkor Laut	...	...	...	...	...	...	...	...	...	...	...	9.66	1.96
Kuala Kurau	...	...	...	...	...	...	...	...	...	...	...	4.55	1.30
Maxwell's Hill	...	...	...	...	...	...	...	...	...	...	...	7.97	1.78
The Cottage	...	...	...	...	...	...	...	...	...	..	...	4.28	1.10

Office of the Senior Medical Officer,
Taiping, 16th March, 1912.

S. C. G. Fox,
Senior Medical Officer.

NEGRI SEMBILAN.

Abstract of Meteorological Readings in the various Districts of the State of Negri Sembilan for the month of December, 1911.

DISTRICT.		Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
				Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
District Hospital,	Seremban			79.6	87.8	72.1	15.7	76.0	.834	73.9	82	N.W.	11.64	3.30
" "	Kuala Pilah			77.9	86.7	71.9	14.8	75.0	.816	73.1	85	...	15.38	4.23
" "	Mantin			...	...	...	...	...	...	...	...	...	16 93	3.70
" "	Tampin			...	...	...	...	...	...	...	...	...	10.19	2.05
" "	Jelebu			...	...	...	...	...	...	...	...	...	7.22	2 57
" "	Port Dickson			...	...	...	...	...	...	...	...	...	8.90	1.50
Beri-beri Hospital	" "			...	...	...	...	...	...	...	...	...	7.97	1.20

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 24th Jan., 1912.

G. D. FREER,
Senior Medical Officer,
Selangor, Negri Sembilan & Pahang.

NEGRI SEMBILAN.

Abstract of Meteorological Readings in the various Districts of the State of Negri Sembilan for the month of January, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
District Hospital, Seremban	...	146.8	80.0	89.0	70.7	18.3	75.7	.820	73.1	79	N. W.	3.26	0.88
,, ,, Kuala Pilah	...	...	78.9	87.8	70.3	17.5	74.6	.783	71.8	80	...	2.11	0.76
,, ,, Mantin	...	...	...	...	...	...	...	...	...	...	...	2.97	0.56
,, ,, Tampin	...	...	80.2	86.6	73.0	13.6	74.2	...	...	...	...	2.31	0.83
,, ,, Jelebu	...	...	...	...	...	...	...	...	...	...	...	3.17	1.28
,, ,, Port Dickson	...	...	...	...	...	...	...	...	...	...	...	.94	0.60
Beri-beri Hospital	...	...	...	...	...	...	...	...	...	...	...	.81	0.45

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 24th Feb., 1912.

G. D. FREER,
Senior Medical Officer.
Selangor, Negri Sembilan & Pahang.